M-Motion Video Adapter/A

Installation and Technical Reference Manual

P/N-95F1093

Copyright Protection Notice

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FCC Required Instructions

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions in this manual, may cause interference to radio communications. It has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operating in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his/her own expense will be required to take whatever measures may be required to correct the interference.

Canadian Department of Communications Compliance Statement

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

Avis de conformité aux normes du ministre des Communications du Canada

Cet équipement ne dépasse pas les limites de Class A d'émission de bruits radioélectriques pour les appareils numériques, telles que prescrites par le Rglement sur le brouillage radioélectrique établi par le ministre des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions radio et télé, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

Japan VCCI

This equipment is Class 1 Equipment (information equipment to be used in commercial and industrial districts) which is in conformance with the standard set by Voluntary Control for Interference by Data Processing Equipment and Electronic Office Machines (VCCI) with an aim to prevent radio interference in commercial and industrial districts.

This equipment could cause interference to radio and television receivers when used in and around residential districts.

Please handle the equipment properly according to the instruction manual.

CAUTION:
Prolonged exposure to excessive noise can cause hearing loss. The volume level on audio headphones must be kept at a reasonable level to avoid hearing loss.

Precaución:
La exposición prolongada a un ruido excesivo puede causar pérdidas de audición. El volumen en los auriculares debe mantenerse a un nivel razonable para evitar pérdidas de audición.

Attention:
l'écoute prolongée d'un bruit excessif peut entrainer des troubles auditifs. Le niveau de volume du casque doit être maintenu à un seuil raisonable afin d'éviter de tels troubles.

VAROITUS:
Pitkäaikainen liian kovan äänen kuuntelu saattaa vahingoittaa korvaa. Kuulokkeiden äänenvoimakkuus tulee pitää hyväksyttävällä tasolla.

Advarsel:
Hvis du utsettes for et høyt støynivå over lengre tid, kan du få nedsatt hørsel. For å unngå nedsatt hørsel ved bruk av hodetelefoner, må lydstyrken holdes på et forsvarlig niv.

Attenzione:
La prolungata exposizione a rumori eccessivi può causare la sordità. Per evitare rischi del genere, si consiglia di regolare il volume degli auricolari a livelli adeguati.

ACHTUNG
Lange Lärmeinwirkung kann Gehörschäden hervorrufen. Die Lautstärke der kopfhörer muß so geregelt sein, daß kein Gehörschäden entsteht.

NB!
Vedvarende udsættelse for høj støj kan forårsage nedsat hørelse.

Styrken i øretelefonerne skal holdes på et rimeligt niveau for at undgå høreskader.

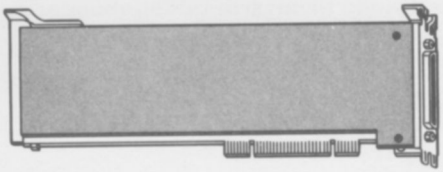
Aviso:
A exposição prolongada a ruído excessivo pode provocar a perda de capacidade auditiva. O volume de som nos auscultadores deve ser mantido a um nível razoável de modo a evitar a perda de capacidade auditiva.

VARNING
Upprepad exponering för högt ljud, kan orsaka hörselskada. Volymen på hörlurarna skall därför inställas på lämplig nivå för att undvika hörselskada.

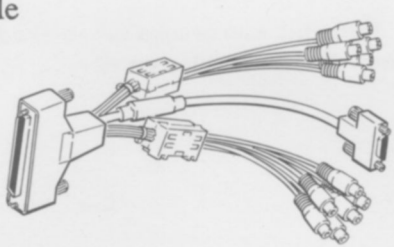
Checklist

In addition to this manual, your carton should contain the following items. You should check to make sure they are all present before you install your adapter.

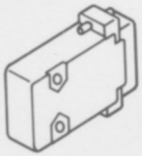
- M-Motion Video Adapter/A



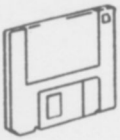
- I/O Cable



- VGA Terminator Plug



- M-Motion Video Adapter/A Software Diskette



If any of these items are missing or damaged, or if you encounter problems while using this product, refer to your point of sale contact.

Contents

Introduction

Tecmar's M-Motion Video Adapter/A (in this manual also referred to as the "M-Motion Video Adapter" or the "Video Adapter") is an advanced video/audio board for IBM® Personal System/2® Micro Channel® computers. It digitizes and displays full color motion video from a wide variety of video sources on any standard PS/2® color display in any VGA mode and can overlay those video images with graphics from the VGA adapter. Video images can be captured as digital data for storage and displayed from storage in full color. The Adapter's audio capabilities support monaural and stereo analog audio. Programmable switching of inputs and controls are provided for both audio and video.

The M-Motion Video Adapter/A supports the M-Control Program, available through IBM.

Features

° Supports all VGA modes

- The board is designed to provide quality pictures in high resolution mode (640 or 720 horizontal PELs).
- Low resolution mode (320 or 360 horizontal PELs) is emulated by doubling VGA PELs. Picture quality may vary with system board clock tolerances.

° Digitizes video and provides function to:

- Map any rectangular region of the input video into any rectangular region of the display

  - Compress the selected input video region, if desired, to fit the specified video buffer region

  - Protect portions of the existing or stored video image from being overwritten by new video

  - Protect portions of the graphics image from being overlaid by video

- Overlay capability in all VGA modes

- Software selected color-keyed overlay allows you to combine graphics and video by designating all 256 color indexes or any one of the 256 color indexes as transparent

- Software configuration of the four video input connectors as either:

  - Up to two Y/C (Super-VHS) video inputs

  - Up to three NTSC/PAL composite video inputs

- Software switching between video input connectors

- Composite Sync (CS) output is available to synchronize the compatible video sources. Composite Sync automatically matches the format of the first video device on the input lines.

  Note: If you purchased an earlier level Adapter (P/N 34F3091) this enhancement is not available even though it is referenced in this manual.

- Software configuration of video inputs for NTSC or PAL format

- Software control of video:

- Brightness
- Contrast
- Fade to black
- Color
- Tint
- Sharpness

° Images may be captured and stored for future viewing

° Audio inputs:

- Up to two stereo analog audio sources or
- Up to four mono analog audio sources or
- One stereo analog audio source and up to two mono analog audio sources
- Software selectable individually or mixed

Note: All analog audio signals in or out are line level.

° Automatic switching to associated audio whenever video is switched

° Outputs line level audio to headphones, stereo amplifiers, or stereo speakers with built-in amplifiers

° Software control of audio:

- Main volume
- Balance
- Bass
- Treble
- Fade
- Digital recording volume
- Digital playback volume

° Software balancing of line audio input levels

° Left or right channel of either stereo input can serve as a mono source for one or both outputs

° Separate or mixed analog and digital audio output

° Software mute for external audio inputs or audio outputs

° Adapter ID (80B3) approved by IBM

° 8514/8515 selection from PS/2 Reference utility, Change Configuration Program

Note: If you purchased an earlier level Adapter (P/N 34F3091) this enhancement is not available even though it is referenced in this manual.

° Advanced diagnostics let you test the functionality of the adapter

Note: Composite Sync test active only in advanced diagnostics

° Twelve month warranty will be provided by IBM

System Requirements

The M-Motion Video Adapter/A requires the slot with the video connector in your IBM PS/2 Micro Channel computer.

To use the M-Motion Video Adapter/A, we recommend that you have the following:

- 1 MB system memory*
- A 3.5 inch diskette drive
- A 20 MB hard disk drive*
- A composite video (NTSC or PAL) or Y/C video source as an input device
- An external speaker or headphone
- A PS/2 color display or compatible
- Windows 3.0 or higher
- DOS 3.3 or higher
- OS/2 Version 1.2 or higher
- One expansion slot must be left vacant to support the power requirements of this adapter. See note below.

Note: The M-Motion Video Adapter/A typically requires 0.065 amps of -12 volts and 0.195 amps of +12 volts from the PS/2 power supply. If you wish to use the M-Motion Video Adapter/A with other adapters that also require +/- 12 volt power, you must be sure the limits of your PS/2 power supply are not exceeded. The M-Motion Video Adapter/A typically requires 2.20 amps of +5 volts from the PS/2 power supply. Consult the IBM PS/2 Technical Reference manuals for the power supply specifications and power requirements of the adapters to be used in your configuration.

* Both system memory and disk space requirements depend upon your operating system and other application software requirements.

Ordering Information

The M-Motion Video Adapter/A comes with an I/O (input/output) cable, VGA terminator plug, software diskette and manual.

Item	IBM Part Number
M-Motion Video Adapter/A complete with I/O cable, VGA terminator plug, software diskette and manual	95F1091

Chapter 1

Installation

Copying an Option Diskette

Before you install your M-Motion Video Adapter/A, you must run the *Copy an option diskette* selection from your PS/2 Reference Diskette. This program will update your IBM Automatic Configuration Program. You should use a backup copy of your Reference Diskette to preserve the original without any changes to it.

You will need these items to copy an option diskette:

- IBM PS/2 Reference Diskette (backup copy)
- M-Motion Video Adapter Software diskette (Contains Adapter Definition File (ADF))

- Insert your IBM Reference Diskette into drive A and turn on your computer (or reset it by pressing Ctrl/Alt/Del, if it is already on).
- Select **Copy an option diskette** from the Main Menu and follow the instructions that appear on the screen.

When you see the message, "Update of the Reference Diskette Complete," you are ready to install your M-Motion Video Adapter in your computer.

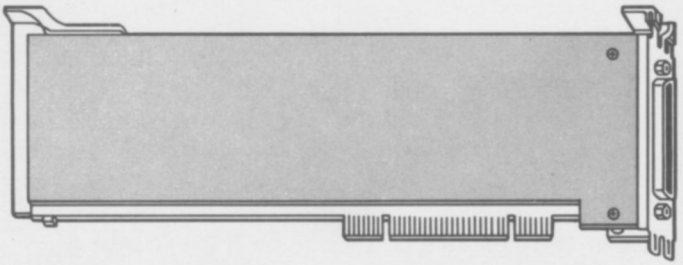
Handling Adapters

Normal movement can build up electrostatic charges in your body through contact with carpeting and furniture. These charges can damage adapters when you handle them. To prevent damage, observe the instructions given below. They are in addition to other precautions such as switching off the power before removing an adapter from the system unit.

- Keep the adapter in its original shipping container until you are ready to install the adapter.
- Make the least possible movement with your body to prevent an increase of static electricity from clothing fibers, carpets, and furniture.
- Just before touching the adapter, discharge to the system unit any static electricity in your body. Do this by touching the metal frame of the system unit. If possible, keep one hand on the frame when you are inserting or removing an adapter.
- Hold the adapter by its edges. Do not touch the printed circuit.
- Do not place the adapter on the machine cover or on a metal table. Machine covers and metal tables increase the risk of damage because they make a discharge path from your body through the adapter.
- Be extra careful in working with adapters when cold weather heating is in use, because such heating can increase static electricity.

Installing the Adapter

- Turn off the power to your computer.
- Turn off the power to all of your external options (display, printer, etc.).
- Unplug your computer and all other options from their source of power (wall outlets, power strips, etc.). Disconnect all external cables.
- Remove your computer cover by following the directions under *Removing the System Unit Cover* in the **Quick Reference** manual that came with your PS/2 computer.
- Unpack your M-Motion Video Adapter and place it on a clean, static-free surface. Hold the adapter by the corners to avoid touching the edge connector or the components on the adapter.



M-Motion Video Adapter

- Identify the 16-bit expansion slot (with video extension) in the computer that matches the connector on your M-Motion Video Adapter. One of the expansion slots on the system board extends further to the rear of the system board than the others. Your M-Motion Video Adapter must occupy this slot.

- Install the adapter in the identified slot by following the instructions under *Installing an Adapter* in the **Quick Reference** manual that came with your PS/2 computer.

- Replace your computer cover by following the directions under *Installing the System Unit Cover* in the **Quick Reference** manual that came with your PS/2 computer.

- Reconnect all the power and external cables you removed earlier, but do not connect any cables to the M-Motion Video Adapter. The PS/2 Display should be cabled to the system board connector. Before you connect anything to the M-Motion Video Adapter, you should follow the instructions in the rest of this chapter under *Running Automatic Configuration* (page 1-7) and *Completing the Installation* (page 1-8).

Running Automatic Configuration

After you install the adapter in your computer, you are ready to run the automatic configuration program. The automatic configuration program allows your computer to recognize the presence of your M-Motion Video Adapter. The PS/2 display should remain connected to the system board display connector until the process is complete. This insures that the screens presented during configuration will be readable, since the palette registers on your M-Motion Video Adapter will not initialize correctly until the PS/2 is properly configured.

- Follow the instructions from your Reference Diskette Utility. Complete automatic configuration.

Note: Display quality can be improved when using the IBM PS/2 8515 color display. After completing the automatic configuration, reboot your system and select *Set Configuration* from the Main Menu. Then select *Change Configuration* from the Set Configuration menu. 8514/8515 selection can be made from the *Change Configuration* menu.

Automatic configuration will default to the 8514 setting, if it is not changed through *Change Configuration*. In case of any I/O Interrupt level conflicts with other installed devices, an asterisk will appear next to that item. Alternate settings should be made through the Change Configuration menu.

Completing the Installation

- After completing the automatic configuration program and saving your changes, you should remove your Reference Diskette and reboot your system. Then insert your M-Motion Video Adapter Diskette in drive A:
- Review the README.VAD file for any changes to this publication, particularly the installation procedures. To review the README.VAD file, enter the following command:

  TYPE A:README.VAD|MORE

- To install the M-Motion Video Adapter/A software type:

  A:
  INSTALL [d:]

  Where d: is the drive on which you wish to install the software. If d: is not specified, the default is drive C. The INSTALL procedure will install the software in a subdirectory named MMEDIA.

The program MMVAINIT performs routines that initialize the M-Motion Video Adapter. This program must be run every time you power on or reset your PS/2 computer system; otherwise, the image on your PS/2 display may contain incorrect colors.

- For DOS, you should include the following lines in your AUTOEXEC.BAT file:

```
C:
CD C:\MMEDIA
MMVAINIT
CD\
```

- For OS/2, you should include the following single line in your OS/2 CONFIG.SYS file:

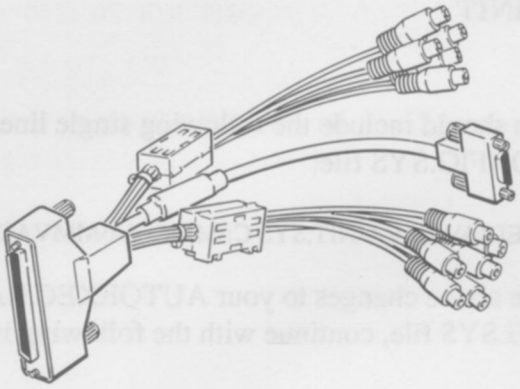
```
DEVICE = C:\MMEDIA\MMVAINIT.SYS C:\MMEDIA\MMVAD.RAW
```

After making the above changes to your AUTOEXEC.BAT file or your CONFIG.SYS file, continue with the following instructions.

- Remove the M-Motion Video Adapter/A Software Diskette.

- Turn off the power to your computer and all of your external options (display, printer, etc.).

- Connect the large (37-pin) connector on the M-Motion Video Adapter I/O cable to the connector on the M-Motion Video Adapter.



- Unplug the display cable from the system board and plug it into the 15-pin VGA Display connector on the M-Motion Video Adapter I/O cable.

- Plug the VGA Terminator into the system VGA output connector. This terminator must be present to allow the system to recognize that a color display is attached to the M-Motion Video Adapter. Refer to the drawing on page 2-4.

- Turn on the power to your computer and all of your external options. At this point, you should see an image on your display.

- Turn to *Chapter 2: Connecting Input and Output Devices* for information on attaching your audio and video Input/Output (I/O) devices.

- Follow the instructions in *Chapter 3: Testing the Adapter* to run the M-Motion Video Adapter diagnostic program and confirm proper operation.

- If attempts to install the M-Motion Video Adapter in the PS/2 fail, contact your place of purchase or service representative for further assistance.

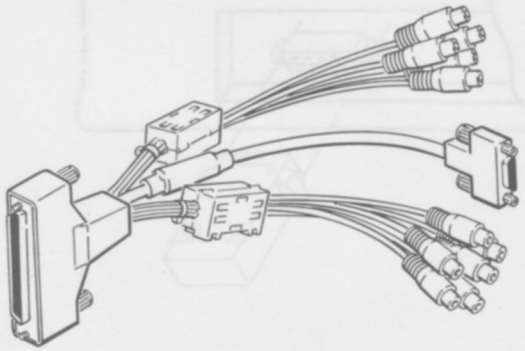
Chapter 2

Connecting Input and Output Devices

The I/O Cable

The M-Motion Video Adapter I/O cable contains:

- Four video connectors labeled V1, V2, V3, and VC
- One Composite Sync output labeled CS
- Four audio input connectors labeled 1R, 1L, 2R, and 2L
- Two audio output connectors labeled OR and OL
- One 15-pin D shell VGA Display connector



Video Input/Output Connectors

VGA Display Connector

Audio Input/Output Connectors

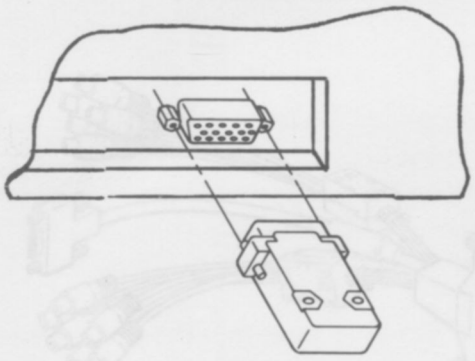
M-Motion Video Adapter Connector

Note on cables: The M-Motion Video Adapter's I/O cable is not long enough to attach directly to input/output devices. You will need to acquire cables to connect the I/O cable to your I/O devices. The M-Motion Video Adapter cable contains female RCA jacks. Consult the user's manual that came with your I/O device for specific information about the device.

PS/2 Display

The PS/2 color display should be cabled to the VGA Display connector on the I/O cable **after** the M-Motion Video Adapter has been installed and successfully configured.

Whenever the PS/2 display is cabled to the M-Motion Video Adapter, the VGA terminator plug **must** be installed in the system board display connector. Otherwise, the PS/2 VGA adapter will not recognize that a color display is attached to the M-Motion Video Adapter, and all VGA and video output will be displayed in monochrome (black and white).



Install the VGA Terminator Plug in the System Board Display Connector

Video Sources

A maximum of three composite video sources can be cabled to the M-Motion Video Adapter at the same time. The composite video (NTSC or PAL) output from a videodisc, VCR, video camera, tuner, etc. may be cabled to video input connectors V1, V2, or V3.

A maximum of two Y/C (S-Video) sources may be cabled to the M-Motion Video Adapter at the same time. Each requires two connections, one for the Y (luminance) signal and one for the C (chrominance) signal. For one of the sources, the Y signal is connected to V1 and the C signal is connected to VC. For the other source, the Y signal is connected to V2 and the C signal is connected to V3.

Each of the four video input connectors may have only one video source cabled to it at a time. Otherwise, any combination of composite video and S-Video sources may be connected at the same time within the limits of available inputs.

In order to synchronize multiple video sources, connect the cable labeled "CS" to the Sync Input of the video sources. The cable should be terminated into 75 Ohms. Composite Sync is not guaranteed to work with any particular video source manufacturer.

Note: The sources must be similar, either all PAL or all NTSC.

Audio Sources

Inputs

Line level audio outputs from a videodisc player, VCR, tuner, CD player, etc. may be cabled to the audio input connectors labeled with a number ("1" or "2") followed by either an L or R. Each of the two audio inputs ("1" and "2") will have both a left (L) and right (R). Each of the two stereo audio inputs may be cabled from a stereo audio source or from two mono audio sources.

Outputs

Line level outputs from the M-Motion Video Adapter may be cabled directly to high impedance headphones or to the line inputs of an amplifier or self amplified speakers. Outputs are labeled OL (Output Left) and OR (Output Right).

Chapter 3

Testing the Adapter

M-Motion Video Adapter/A Software Diskette

The M-Motion Video Adapter software diskette contains these files:

- README.VAD is a text file that provides current information about the M-Motion Video Adapter. To look at this file, you should insert the M-Motion Video Adapter Software Diskette into drive A: and enter this command:

  >TYPE A:README.VAD |MORE

- MMVAD.EXE is the diagnostic program.

- MMVAD.RAW is used by MMVAD.EXE and MMVAINIT.

- MMVAD.DAT is the audio file that is played in MMVAD.EXE

- MMVAD.PIC is the picture file (Parrot) displayed in MMVAD.EXE.

- MMVAD.HWS is a file used by the M-Control Program.

- MMVAINIT.EXE is used to initialize the adapter for DOS. This file should be invoked in your AUTOEXEC.BAT file. Refer to the *Completing the Installation* section in this manual.

- MMVAINIT.SYS is used to initialize the adapter for OS/2. This file should be invoked in your OS/2 CONFIG.SYS file. Refer to the *Completing the Installation* section in this manual.

° INSTALL.BAT is the DOS version of the installation file. This file will copy the files necessary to initialize the adapter.

° INSTALL.CMD is the OS/2 version of the installation file.

° MMVADVER.EXE and MVER.EXE are utilized by INSTALL.BAT and INSTALL.CMD respectively. They determine the revision level of the adapter.

° @80B3.ADF is the adapter definition file that provides the information needed to configure your M-Motion Video Adapter into your PS/2 system.

° CONFIG.SYS runs the diagnostic program when you boot from the M-Motion Video Adapter software diskette.

After you install the M-Motion Video Adapter according to the instructions in Chapter 1 and the I/O devices as described in Chapter 2, you are ready to test your adapter by running the M-Motion Video Adapter diagnostics.

The M-Motion Video Adapter/A diskette is bootable. You must run the M-Motion Video Adapter diagnostics from this diskette.

- Make a DISKCOPY of your M-Motion Video Adapter diskette. Put your original M-Motion Video Adapter diskette away in a safe place and use the backup you just made to run the diagnostics.

To run the standard M-Motion Video Adapter diagnostics, insert your backup diskette in drive A: and reset your computer system by pressing CTRL-ALT-DEL.

The diagnostics will take you through all the steps necessary to check out the M-Motion Video Adapter. You should follow the

directions that appear on the screen. At times you will be required to answer questions about what you observe. Error messages will appear if problems are identified.

Advanced Diagnostics

You also may run the advanced version of the diagnostics by entering a CTRL-A instead of ENTER on the initial starting screen.

The advanced diagnostics present two menus of tests, one menu for video and another menu for audio. The advanced diagnostics allows you to select individual tests and loop them (perform repeatedly) so that you can identify intermittent problems. If an intermittent problem is detected in the advanced diagnostics mode, press F10 to display an error message.

Note: Composite Sync is active only in advanced diagnostics. This test was designed to examine the Composite Sync output by looping the signal back to the Video Input 3 (V3). This test requires a male RCA to a male RCA cable.

Further problem isolation is described in Chapter 4, Troubleshooting Hints under *Image Not Vertically Centered or Suspect Composite Sync Output Failure*.

Diagnostic Procedures

If you are experiencing any problems using the M-Motion Video Adapter, follow these diagnostic procedures to determine the cause of the failure. Always start with step 001.

Step 001

The M-Motion Video Adapter diagnostics assume that the PS/2 system is operating correctly. You must confirm this with the PS/2 system diagnostics prior to running the M-Motion Video Adapter diagnostics. **While running the PS/2 diagnostics, the display must be removed from the M-Motion Video Adapter I/O cable connector and plugged into the system board display connector.** Refer to the PS/2 *Quick Reference* manual for instructions on checking out your computer.

Do the PS/2 system diagnostics complete without error?

If YES

Go to step 003

If NO

Remove the M-Motion Video Adapter and repeat the PS/2 diagnostics, and then go to step 002.

Step 002

Do the PS/2 diagnostics complete without error?

IF YES

Replace the M-Motion Video Adapter and go to step 003.

IF NO

Correct the problem and verify operation by repeating the PS/2 diagnostics. Reinstall the Video Adapter and go to step 003.

Step 003

The following procedures require the presence of some image on the PS/2 display screen. It doesn't matter whether the image is text or graphics, nor does it matter how much text or graphics is displayed.

Does the PS/2 screen contain an image?

If YES
Go to step 005
If NO
Go to step 004

Step 004

Either the PS/2 system unit or the PS/2 display is powered off.

Are the PS/2 system unit and the PS/2 display powered on?

If YES
Go to step 001
If NO
Power on the PS/2 system unit and the PS/2 display, wait for the system to complete loading, and then go to step 005.

Step 005

Is the PS/2 Display connected to the M-Motion Video Adapter I/O Cable or to the system board display connector?

If connected to the M-Motion Video Adapter I/O Cable
Go to step 007
If connected to the system board display connector
Go to step 006

Step 006

Do not power down the system for the following procedure. Use care to properly align the connectors as they are being inserted.

The appearance of the displayed image should be the same after the following cabling change as it is now with the display plugged into the system board display connector.

- Plug the display into the M-Motion Video Adapter I/O cable.
- Plug the VGA Terminator Plug into the system board display connector.

Does the displayed image appear the same?

If YES
Go to step 007

If NO
Go to step 008

Step 007

Is the displayed image normal without distortion or unusual coloration?

If YES
Go to step 009

If NO
Go to step 008

Step 008

Do not power down the system for the following procedure. Use care to properly align the connectors as they are being inserted.

The appearance of the displayed image should be the same after the following cabling change as it is now with the display plugged into the M-Motion Video Adapter I/O cable.

- Plug the display into the system board display connector.

Does the displayed image appear the same?

If YES

This appears to be a PS/2 system or display failure. Rerun the PS/2 diagnostics.

If NO

Possible causes (refer to *Troubleshooting Hints* in *Chapter 4:If Problems Occur* for details):

- Adapter Contacts/Socket
- Defective M-Motion Video Adapter I/O Cable
- Defective M-Motion Video Adapter

Double check the cabling of the display, and check the display plug and system board display connector for contamination, bent pins, or other damage.

Step 009

The proper setup for running diagnostics requires:

- One or more valid video sources properly cabled to the M-Motion Video Adapter I/O cable video input(s)

- One or more audio sources, either monaural or stereo, properly cabled to the M-Motion Video Adapter I/O cable audio input(s)
- One or more audio output devices properly cabled to the M-Motion Video Adapter I/O cable audio output(s)

  Note that the PS/2 speaker can be used instead of an output device, but a small amount of M-Motion Video Adapter circuitry will not be tested in this case. Audio is output to both the PS/2 speaker and the audio outputs while testing.

- Insure that the M-Motion Video Adapter diagnostics diskette is inserted in drive A and either:

  Turn off power for 10 seconds and turn power back on
  OR
  Depress the CTRL-ALT-DEL keys all at the same time.

This will reboot the system from drive A. Enter your power-on password if necessary. The system will automatically start the M-Motion Video Adapter diagnostics.

- Follow the directions on the screen. If you are required to make an observation about system operation, a beep will sound and a question will be displayed at the bottom of the screen.

  Note: If the problem is related to Composite Sync output, refer to *Advanced Diagnostics* in Chapter 3 and *Image Not Vertically Centered or Suspected Composite Sync Failure* in Chapter 4, Troubleshooting Hints.

Do the diagnostics complete without error?

If YES

The M-Motion Video Adapter is operating normally. Go to step 010.

If NO

Note the error and refer to the *Error Messages* section of this manual.

Step 010

Is trouble still present or suspected?

- Intermittent problems may require repetitive testing or parts swapping to isolate the cause.

- Appropriate hints from the Troubleshooting section may aid in determining the failure.

- Obtain assistance in determining if the application software is causing the problem.

Error Messages

Each of the diagnostic tests will supply an error message number, if the M-Motion Video Adapter does not pass the test. The error number should be noted and used as an entry to the following error descriptions. It is assumed that the PS/2 system diagnostics have confirmed proper PS/2 system operation prior to running the M-Motion Video Adapter diagnostics.
Troubleshooting hints are found in Chapter 4.

ERROR #V10 - Adapter not found

Possible Causes:

- Adapter contacts/socket (See Troubleshooting Hints)
- PS/2 not configured properly (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V20 - Adapter not initialized

Possible Causes:

- Adapter contacts/socket (See Troubleshooting Hints)
- PS/2 not configured properly (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V30 - Could not open MMVAD.RAW

Possible Causes:

° File named MMVAD.RAW was not in the default subdirectory.

ERROR #V40 - Could not read MMVAD.RAW

Possible Causes:

° PS/2 disk error. Recopy MMVAD.RAW from the original diskette.

ERROR #V50 - Error reading adapter registers

Possible Causes:

° Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V60 - IIC Bus failure

Possible Causes:

° Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V70 - Video Input Error

Possible Causes:

° No Video (See Troubleshooting Hints)

° Unsupported video format. Must be NTSC-M, PAL-B, G, H, I, or S-VIDEO version of the supported NTSC and PAL

formats. Note that PAL S-VIDEO is not supported in these diagnostics, although it is supported by the M-Motion Video Adapter.

° Defective video cable (See Troubleshooting Hints)

° Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)

° Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V100 - Error VGA Pass Through

Possible Causes:

° Defective or missing VGA Terminator Plug (See Troubleshooting Hints)

° Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V200 - Error Video RAM Test

Possible Causes:

° Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V300 - Error Video Buffer Output

Possible Causes:

° Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V400 - Error Displaying Stripes

Possible Causes:

° Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V500 - Error Testing Black Level

Possible Causes:

° Defective video input (See Troubleshooting Hints)

° Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V600 - Error Displaying Black and White Video

Possible Causes:

° No Video (See Troubleshooting Hints)

° Defective video cable (See Troubleshooting Hints)

- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)
- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V610 - Error Displaying Color Video

Possible Causes:

- Source video is black and white
- Incorrect cabling if source is S-Video
- Defective VGA Terminator Plug (See Troubleshooting Hints)
- No Video (See Troubleshooting Hints)
- Defective video cable (See Troubleshooting Hints)
- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)
- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter

ERROR #V700 - Error Displaying Compressed Video

Possible Causes:

- No Video (See Troubleshooting Hints)

- Defective video cable (See Troubleshooting Hints)
- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)
- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V710 - Pattern RAM Error

Possible Causes:

- No Video (See Troubleshooting Hints)
- Defective video cable (See Troubleshooting Hints)
- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)
- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V800 - Error On Video Protect

Possible Causes:

- No Video (See Troubleshooting Hints)
- Defective video cable (See Troubleshooting Hints)

- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)
- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V900 - Error on Graphic Protect

Possible Causes:

- No Video (See Troubleshooting Hints)
- Defective video cable (See Troubleshooting Hints)
- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)
- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #V910 - InfoWindow Compatibility Error

Possible Causes:

- No Video (See Troubleshooting Hints)
- Defective video cable (See Troubleshooting Hints)
- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)

- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #A1000 - Right Playback Digitized Audio Error

Possible Causes:

- External audio devices (See Troubleshooting Hints)
- Defective audio cable (See Troubleshooting Hints)
- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)
- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #A1001 - Left Playback Digitized Audio Error

Possible Causes:

- External audio devices (See Troubleshooting Hints)
- Defective audio cable (See Troubleshooting Hints)
- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)
- Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #A1002 - Interrupt Failure

Possible Causes:

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

° Failure with the PS/2 system

ERROR #A1010 - No Line Audio Error

Possible Causes:

° No Audio (See Troubleshooting Hints)

° Defective audio cable (See Troubleshooting Hints)

° Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)

° Adapter contacts/socket (See Troubleshooting Hints)

° Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #A1020 - Recording Digitized Audio Error

Possible Causes:

° Insufficient volume level set by operator when starting diagnostics (Note: Playback volume may differ from the volume level of the line audio that was recorded).

- No Audio (See Troubleshooting Hints)
- Defective audio cable (See Troubleshooting Hints)
- Defective M-Motion Video Adapter I/O Cable (See Troubleshooting Hints)
- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

ERROR #A1030 - Audio Loop Back Error
ERROR #A1031 - Audio Loop Back Error - 52Hz
ERROR #A1032 - Audio Loop Back Error - 3KHz
ERROR #A1033 - Audio Loop Back Error - LOW LEVEL - 1KHz
ERROR #A1034 - Audio Loop Back Error - Noise

Possible Causes:

- Adapter contacts/socket (See Troubleshooting Hints)
- Defective M-Motion Video Adapter (See Troubleshooting Hints)

Chapter 4

If Problems Occur

Service Parts

You can purchase service parts for the M-Motion Video Adapter/A as shown below:

Item	IBM Part Number
M-Motion Video Adapter/A (board only)	95F1094
M-Motion Video Adapter/A I/O Cable	95F1095
VGA Terminator Plug	34F3088
M-Motion Video Adapter/A Software Diskette	34F3092
M-Motion Video Adapter/A Manual	95F1093

Troubleshooting Hints

The suspect areas listed below are referenced by the *Error Messages and Diagnostic Procedures* sections in Chapter 3. Service personnel may also wish to refer directly to these hints when the suspect area is obvious from other observations.

Adapter Contacts/Socket

Unpredictable problems can be caused by poor contact. The contacts on the M-Motion Video Adapter must make good electrical connection with the socket on the PS/2 system board. Whenever this area is suspect, turn off power to your computer, unplug it, and remove the M-Motion Video Adapter according to the instructions in your IBM *Quick Reference* manual. Holding the adapter by the edges, examine the contacts on the M-Motion Video Adapter and the socket it plugs into for damage or contamination. Correct any problems found and replace the adapter in the socket according to instructions in your IBM *Quick Reference* manual. Be sure that it clicks firmly into place.

Adapter Installation Problems

Your M-Motion Video Adapter may not be properly inserted in the PS/2 socket. Refer to **Adapter Contacts/Socket** in this section.

No Audio

Refer to **External Audio Devices** in this section.

Blank Screen

Following the removal of and replacement of the M-Motion Video Adapter, you may experience a blank screen or incorrect

color and two beeps when you turn the system power on. This indicates that you need to run automatic configuration. The VGA display connector must be connected to the system board display connector prior to running automatic configuration. Refer to the installation instructions in this manual for further assistance. Remember to reinstall the VGA terminator on the system board display connector at the end of this procedure.

Defective Audio Cable

If possible, substitute a known good cable for the suspected audio cable. A suspected cable may be checked with a continuity tester or volt/ohm meter. Both the signal and the ground (shield) conductors of the cable should be tested. If no defect is found, the cable should be moved around while continuity is monitored to check for possible intermittent defects.

Defective M-Motion Video Adapter

If not already done, refer to *Chapter 3: Testing the Adapter* and run the diagnostics. Be certain to follow the procedures under Adapter Contacts/Sockets in this chapter before replacing the adapter. If possible, substitute a known good adapter as a further check, if this procedure does not fix the problem.

Defective M-Motion Video Adapter I/O Cable

If possible, substitute a known good cable for the suspected cable. If this is not possible:

- Examine the connectors on the cable and the socket on the M-Motion Video Adapter for damage or contamination.

- Test the continuity of the suspected signal lines between each RCA plug and its corresponding pin number on the 37-pin

connector. Refer to the **Cables** section of *Chapter 5: Technical Information* in this manual for the wiring connections.

- Test the continuity of the shield between each RCA plug tested above and its corresponding pin number on the 37-pin connector. Refer to the **Cables** section of *Chapter 5: Technical Information* for the wiring connections.

- If these two tests do not help to determine the source of the problem, then check for shorts between each individual pin and the rest of the pins on the 37-pin connector.

- If no problem has been found, the above tests should be repeated while gently moving the cable and monitoring continuity to check for possible intermittent defects.

Note: Although the cables may pass the tests performed above, there may still be a problem with the cable due to high capacitance on a signal line.

Defective VGA Terminator Plug

Examine the plug and socket for damage, bent pins, or contamination. Refer to the **Cables** section of *Chapter 5: Technical Information* for the wiring of the terminator plug. The resistance values given for the terminals should be checked for accuracy. Refer to the **No Color** hints in this section.

Defective Video Cable

Follow the same procedures as listed for Defective Audio Cables in this chapter.

Defective Video Input

This could be an external condition that may cause failure of the Black Level test.

- Disconnect any video inputs that do not have live video present and rerun the Black Level test.

- If the failure persists, short circuit unused video inputs and re-run the test. This should eliminate any external cause of the noise. If the test is successful, there is probably some environmental interference being generated by nearby equipment. It can be ignored if there are no audio or video quality problems other than this test failure.

If the test continues to fail, the video cables and the M-Motion Video Adapter I/O cable are suspect. Defective circuit grounds are one likely cause. Continuity tests may not find the problem.

External Audio Devices

- Verify that the components are cabled properly. The specific audio and video inputs and outputs to be used are determined by the application program.

- Verify that the components are properly powered. Each power cord should be plugged into a live outlet. Power switches should be on, and any batteries required should be confirmed to be good.

- Verify that equipment is set up properly and all controls are in proper operating position.

- The audio outputs from the M-Motion Video Adapter are at line level and should be plugged into matching inputs. Do

not connect speakers directly to M-Motion Video Adapter audio outputs unless they contain a built in amplifier. Note that during diagnostics, audio is output through both the PS/2 speaker and the M-Motion Video Adapter audio outputs. Try disconnecting the audio outputs and listening to the PS/2 speaker.

- If equipment is available that has an audio output (videodisc player, VCR, radio receiver, TV tuner, CD player, tape player, amplifier, etc.), then cable it directly to the appropriate connectors on the external equipment to verify proper operation without the M-Motion Video Adapter being involved.

- Try using a different channel or input to isolate the problem.

Image Not Vertically Centered or Suspected Problem With Composite Sync

The purpose of Composite Sync is to get all attached video devices to scan at the same time. This is accomplished by sending a "clocking" signal through the Composite Sync cable to all of the video devices which are connected "in-line". When the video devices are out of sync, one or more of the images will break up with the top part of the picture on the bottom of the screen and the bottom part of the picture on the top of the screen.

  - Verify that the M-Motion Video Adapter is functioning properly by running the Composite Sync Loop Test from the Advanced Diagnostics.

  - Verify that all cables on the Composite Sync path are good. Substitute known good cables, if possible.

- Verify that all video input devices are compatible (i.e. The output is an NTSC format or a PAL format).

- Verify that the last video device is terminated into 75 Ohms. Usually, the device will have a switch that can be set to 75 Ohms On/Off. If not, refer to the manufacturer's specification.

Note: Verify that the application software's video input requirements have been met (i.e. If only two video sources are connected to the adapter, but three sources are selected as input by the software, you will get a composite sync error failure).

Microphone Inoperable

Most microphones require an amplifier to raise microphone output to line level in order to be compatible with the M-Motion Video Adapter audio inputs. Refer to **External Audio Devices** in this chapter for additional hints.

Microphone Input Noisy

A buzz or hum can be caused by:

- Microphone cable too long

- Unshielded or defective cable

- Defective microphone

- Bent connectors

- Ground loop and/or antenna effects

Popping or cracking noises can be caused by:

- Defective cables
- Defective connectors

No Audio

- Verify that any audio inputs are at line level. In some cases an amplifier may be needed to properly match M-Motion Video Adapter input signal requirements. This would be true for most microphones and turntables.

- Follow the same procedures as listed for External Audio Devices in this chapter.

No Color

The VGA Terminator plug must be inserted in the system board display connector whenever the display is plugged into the M-Motion Video Adapter. Otherwise, the system will not recognize that a color display is attached, and all screens (both graphics and video) will be black and white. The presence of the plug is checked by the system each time you reboot or power on the system. If the plug is properly inserted; and there is still no color after you reboot, refer to the *Defective VGA Terminator Plug* hint in this section.

No Video

- Verify that the video input is composite video only, and not modulated video. Some devices (videodisc players and VCRs, for example) have more than one type of output. Modulated video outputs must be cabled to a tuner and typically have an F connector.

- Verify that the components are cabled properly. The specific audio and video inputs and outputs to be used are determined by the application program.
- Verify that the components are properly powered. Power cords should be plugged into a live outlet, power switches should be on, and any batteries required should be confirmed to be good.
- Verify that equipment is set up properly and all controls are in proper operating position.
- If possible, verify the video source by connecting it directly to a video display.
- Verify the video cables by following the procedures given under Defective Video Cables in this chapter.
- Verify the M-Motion Video Adapter is functioning properly (See Diagnostic Procedures).

Noisy Audio

Possible causes:

  - Defective audio cable (See hint in this section)
  - Defective M-Motion Video Adapter I/O Cable (See hint in this section)
  - External audio devices (See hint in this section)

PS/2 Not Configured Properly

In addition to recognizing the existence of the M-Motion Video Adapter, the configuration of the PS/2 with the PS/2 Reference Diskette should be used to resolve any I/O address and interrupt conflicts between the M-Motion Video Adapter and other installed adapters. Refer to the PS/2 **Quick Reference** Manual and reconfigure the system. Verify that the M-Motion Video Adapter is configured properly and that there are no conflicts with other adapters.

Video Quality Poor

Possible causes:

- Defective video cables (See hint in this section)
- Defective M-Motion Video Adapter I/O Cables (See hint in this section)
- Invoke advanced diagnostics and use video adjustments to see if the quality is due to poor video control adjustments

If the problem only occurs in low resolution modes (320 or 360 horizontal PELs), the emulation ability of the adapter may be exceeded with the current system board.

Chapter 5

Technical Information

Specifications

Video Inputs

Standard NTSC, PAL, or S-VIDEO	
Signal voltages	
Maximum	1 Volt
Nominal	0.7 Volt
Input impedance	75 Ohms
Composite Sync Out	>2 Volts into 75 Ohms

Audio Inputs

Line level signal	
Maximum	3 Volts peak
Nominal	1 Volt Rms
Impedance	10K Ohms
Bandwidth	100 Hz to 3.7 KHz
Digitizing Sampling Rate	7.8 KHz

Audio Outputs

Line Level signals	
Maximum	3 Volts peak
Nominal	1 Volt Rms
Drive Capacity	5K Ohms
Analog Audio Bandwidth	100 Hz to 3.4 KHz

Monitor Output

Standard IBM PS/2 VGA signals

Connectors

Audio and Video	RCA
Monitor	15-pin high density D shell

Power Consumption

+5V	2.2 Amps typical
+12V	.195 Amps typical
-12V	.065 Amps typical

The above power consumption requires that you leave a PS/2 expansion slot empty in order to stay within the power limits of the system.

Cables

M-Motion Video Adapter I/O Cable Wiring

The M-Motion Video Adapter I/O Cable is made up of twelve individual cables. All twelve cables are attached at one end to the M-Motion Video Adapter's connector, a 37- pin D shell connector which plugs into the M-Motion Video Adapter. The I/O devices are attached to the other ends of these cables via the I/O Connectors. The PS/2 Display is attached via the PS/2 Display connector. The I/O Connectors are all RCA jacks. The PS/2 Display connector is a three row 15-pin D shell socket. The wiring of these cables to the M-Motion Video Adapter's connector is shown below, as is the wiring of the VGA Terminator Plug.

Note: The center pin of RCA style connectors is signal, and the outside shell is ground.

PS/2 Display

M-Motion Video Adapter Connector	PS/2 Display Connector	Signal Name
Pin 6	Pin 1	Red
Pin 7	Pin 2	Green
Pin 5	Pin 3	Blue
	Pin 4	N/C
Pin 29	Pin 5	V Sync Gnd
Pin 25	Pin 6	Red Gnd
Pin 26	Pin 7	Green Gnd
Pin 24	Pin 8	Blue Gnd
	Pin 9	N/C
Pin 28	Pin 10	H Sync Gnd
	Pin 11	N/C
	Pin 12	N/C
Pin 9	Pin 13	H Sync
Pin 10	Pin 14	V Sync
	Pin 15	N/C

Video Inputs

M-Motion Video Adapter Connector	I/O Label	Signal Name
Pin 4	V1	Video Input 1
Pin 23	V1	Video Input 1 Ground
Pin 2	V2	Video Input 2
Pin 21	V2	Video Input 2 Ground
Pin 3	V3	Video Input 3/Chrominance Input 2
Pin 22	V3	Video Input 3/Chrominance Input Ground
Pin 1	VC	Chrominance Input 1
Pin 20	VC	Chrominance Input 1 Ground
Pin 8	CS	Composite Sync
Pin 27	CS	Composite Sync Ground

Audio Inputs

M-Motion Video Adapter Connector	I/O Label	Signal Name
Pin 19	1L	Audio Input 1 Left
Pin 37	1L	Audio Input 1 Ground
Pin 18	1R	Audio Input 1 Right
Pin 36	1R	Audio Input 1 Ground
Pin 16	2L	Audio Input 2 Left
Pin 34	2L	Audio Input 2 Ground
Pin 17	2R	Audio Input 2 Right
Pin 35	2R	Audio Input 2 Ground

Audio Outputs

M-Motion Video Adapter Connector	I/O Label	Signal Name
Pin 15	OL	Audio Output Left
Pin 33	OL	Audio Output Left Ground
Pin 14	OR	Audio Output Right
Pin 32	OR	Audio Output Right Ground

VGA Terminator Plug

15-pin high density D shell plug that simulates a color display.

The wiring of the Terminator Plug is as follows:

Pin	to	Pin	Resistance
Pin 1		Pin 6	75 Ohms
Pin 2		Pin 7	75 Ohms
Pin 3		Pin 8	75 Ohms
Pin 10		Pin 11	0 Ohms

Pin 9 is removed and the other pins are unconnected.

Glossary

AUTOEXEC.BAT A batch file that runs automatically when you power on or reset your computer.

C Chrominance (color) component of a video signal.

Chrominance The color component of a video signal.

Composite Sync Linear addition of Horizontal and Vertical Sync.

Composite Video The luminance, chrominance, and sync signals combined into a single composite signal. This signal is not modulated by radio frequencies.

Jack A connecting device to which a wire or wires of a circuit can be attached and that is arranged for insertion of a plug.

Line Audio The audio level generally used to convey audio signals between components of an audio system. Microphone outputs, which are very weak, must be preamplified to line level for use with the M-Motion Video Adapter. Line level signals will drive most headphones directly, but must be amplified to drive speakers.

Live Video A video signal which is being continuously updated by the video device supplying the signal to the M-Motion Video Adapter. This does not imply motion within the

video image, simply that the video image is not frozen in the M-Motion Video Adapter.

Luminance The brightness component of a video signal.

Mono Short for monaural. Monaural sound is sound coming from a single source.

NTSC National Television System Committee. Video signals conforming to the standard defined by this committee are referred to as NTSC video signals.

NTSC-M The M designates a 525-line/60-field, 4.2-MHz bandwidth, 4.5-MHz sound-to-picture carrier spacing monochrome video system. Thus, NTSC-M describes a color system employing the NTSC technique and specifications for introducing the chrominance information within the constraints of the above basic monochrome signal values. This is the standard used in the U.S.

PAL Phase Alternation Line. This is the video signal standard used in many European countries.

PAL-B, G, H, I The B, G, H, and I designate specific monochrome video transmission characteristics relating to the number of scan lines, fields, bandwidth, and sound-to-picture carrier spacing. Thus, PAL-B, G, H,

	or I describes a color system employing the PAL technique and specifications for introducing the chrominance information within the constraints of the above basic monochrome signal values.
PEL	Picture element. Also known as pixel.
Plug	A connecting device to which a wire or wires of a circuit can be attached and that is arranged for insertion of a jack.
Socket	The receptacle or slot on the system board where the M-Motion Video Adapter is plugged in.
S-VHS	S-Video implemented on VHS equipment.
S-Video	Video with separated Y and C components.
VCR	Video cassette recorder.
Y	Luminance (brightness) component of a video signal.

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